| L Number | Hits | Search Text | DB | Time stamp |
|---|---|---|---|---|
| 1 | 3 | amplitude adj modulation with texture | USPAT | 2002/11/20 14:15 |
| 2 | 1 | amplitude adj modulation with texture | US-PGPUB | 2002/11/20 14:17 |
| 3 | 20 | modulation with texture | US-PGPUB | 2002/11/20 14:17 |
| 4 | 132 | modulation with texture | USPAT | 2002/11/20 14:24 |
| 5 | 1 | ("4727365").PN. | USPAT | 2002/11/20 14:25 |

US-PAT-NO: 4905164

DOCUMENT-IDENTIFIER:   US 4905164 A

TITLE:   Method for modulating color for effecting color
cell texture


---------- KWIC ---------

Cell Texture image modulation described in the Bunker et al
application uses
monochrome modulation of an existing data base face color
that is combined with
face translucency information.  That is, the cell texture
processing for each
cell is controlled by the intensity of a composite color
assigned to and
corresponding translucency of a face.  True full color cell
texture modulation
could be produced by sequentially processing three faces,
each face being
assigned one of the triad of primary colors (i.e. red,
green, blue; hereinafter
"RGB"), with appropriate intensity and translucency
obtained from the texture
map for each cell.  However, this approach would be very
inefficient.  Such
processing would consume a large portion of available real
time image
processing capability.  Furthermore, a straightforward
modification to add true
full color cell modulation to the configuration of Bunker
et al would require a
substantial increase in cell texture hardware.

While some previous systems have permitted simultaneous but
equal modulation of
all RGB components of a pixel (i.e., monochrome
modulation), it was not
practical prior to the present invention to have
individualized independent
true full color modulation of each of the respective RGB
components for cell
texturing in a real time image generation system.  True

full color modulation
as used herein may be described as the ability to control the RGB components by
independently modulating the RGB components using a single texture code so that
a realistic color image may be displayed on a single face.

It is therefore an object of the present invention to provide real-time
computer image generation with true full color cell texture modulation.

It is another object of the invention to provide a real time video image
generator with true full color cell texture modulation while minimizing
hardware requirements.

FIG. 2 is a block diagram of a cell texture generator in accordance with the
present invention. Although only a portion of the cell texture generator
circuitry (i.e. red color components 200) for processing data along pixel
computation paths is shown in detail in order to avoid undue repetition, it is
to be understood that similar circuitry 210, 220 and 230 may be used for
generating each of the green, blue and translucency outputs of the cell texture
generator, respectively. Analogous red, green, blue and translucency circuitry
may also be used for providing texture modulation for each parallel pixel
processing path that a real time image generation system may require. Since
translucency data are processed analogously to color data, hereinafter
reference to color may also be taken to apply to translucency unless otherwise
noted.

In order to reduce word lengths representative of color for decreasing memory
size requirements in order to minimize cost and to increase speed of
computation and flexibility of texture rendition, the entire color spectrum is

represented by a set of predetermined quanta, or modulation
values, of color.
A general objective of color spectrum quantization is to
select a relatively
small number of members or color quanta forming a set of
color quanta such that
a predetermined one of the members of the set may be used
to represent each of
the colors of the original or source image that is to be
displayed, while
maintaining a perceived pleasing and accurate rendition of
the source image in
the image that is ultimately displayed.  Attempts to use
uniformly distributed
color quanta have resulted in significant noticeable
differences, such as
contouring, between source images and the corresponding
displayed images formed
from the uniformly distributed quanta of color.
Disadvantages of using a set
of color quanta, such as a compressed 8-bit code, to
represent the entire color
spectrum may be eliminated by employing a pyramidal or
tapered filtering color
quantization scheme to select the members of the set of
color quanta in
accordance with the present invention.  A particular
tapered quantization
technique that is employed in a presently preferred
embodiment of the present
invention is similar to the Median Cut method described in
"Color Image
Quantization For Frame Buffer Display" Paul Heckbert,
Computer Graphics, Vol.
16, No. 3 (July 1982).

113g and image data 215g will be described below in turn.

US-PAT-NO: 5138443

DOCUMENT-IDENTIFIER:   US 5138443 A

TITLE:   Image processing apparatus having means for
synthesizing binarized
image data


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The input image signal 115 and gradation/resolution
switching signal LCHG 141
are input to a texture processing unit 101g.  The texture
processing unit can
be roughly constituted by a texture memory 103g for storing
a texture pattern,
a memory RD,WR address control unit 104g for controlling
the memory 103g, and a
calculation circuit 105g for performing modulation
processing of input image
data on the basis of the stored pattern.  Image data
processed by the texture
processing unit 101g is then input to a zoom, mosaic, taper
processing unit
102g.  The zoom, mosaic, taper processing unit comprises
double buffer memories
105g and 106g, and a processing/control unit 107g, and
various processing
operations are independently controlled by the CPU 20.  The
texture processing
unit 101g, and the zoom, mosaic, taper processing unit 102
can perform texture
processing and mosaic processing of independent areas in
accordance with
processing enable signals GHi1 (119) and GHi2 (149) sent
from the switch
circuit N.

FIG. 32 is a circuit diagram for explaining the texture
processing unit.  A
write section of modulation data 218g of the texture memory
113g and a
calculation section (texture processing) of data 216g from
the texture memory